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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/745,350	12/21/2000	Ram W. Sabnis	27710-A	2350

7590 11/06/2002
HOVEY, WILLIAMS, TIMMONS & COLLINS
Suite 400
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Kansas City, MO 64108

EXAMINER

BARRECA, NICOLE M

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 11/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/745,350

Applicant(s)

SABNIS ET AL.

Examiner

Nicole M. Barreca

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 September 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3, 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. Claims 1-30 are pending in this application.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 5, 13, 14, 17, 23 and 29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It unclear what is meant by "strain energy", as recited in claims 5 and 23.

The use of the term "substantially" renders claim 13 indefinite given that there are no guidelines in the specification to determine the scope. According to the MPEP, the term "substantially is a broad term and is only definite in view of general guidelines in the specification. See MPEP 2173.05 (b).

Claim 14 recites "etching said developed photoresist layer". It is unclear if the (patterned) developed photoresist layer itself is further patterned by etching or if the developed photoresist layer is used as a mask to etch an underlying layer.

It is unclear what is meant by a "percent conformality", as recited in claims 17 and 29.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 3, 4, 5, 7, 15-17, 19, 21-23, 25, 27-29 are rejected under 35

U.S.C. 102(b) as being anticipated by Haaland (US Patent 5,991,081).

6. Haaland discloses antireflection coating and coated articles. The layers are formed by plasma enhanced chemical vapor deposition (PECVD). In a preferred embodiment the antireflection film is a layer of polymeric fluorocarbon which have refractive indices generally less than 1.4. One or more molecular precursors are mixed with inert gas flow and excited with electrical power to produce with a plasma. The plasma excites, dissociates and ionizes the precursor, producing reactive fragments that are transported to the surface of the substrate and polymerize to form films. These films have refractive properties that depend on the precursors, the deposition conditions and film thickness. Perfluorinated organic compounds such as perfluoroaliphatic, perfluorocycloaliphatic and other fluorocarbon compounds. See column 6, line 62 through column 7, line 40 and Table 1. The antireflective layers were tested using wavelengths between 300 and 750 nm (col.5, 15-16). The thickness of the antireflection layer is chosen and can be controlled to achieve AR properties. A typical change in reflectance with the thickness of a single layer antireflection layer is shown in figure 5. The reflectance of the 387 nm layer is $\frac{3}{4}$ wave at 516 nm and is reduced to a value equal to that for $\frac{1}{4}$ wave layer (125 nm) at 500 nm (col.7, 41-55).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 3, 4, 6-12, 18, 19, 21, 22, 24, 25, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eissa (US Patent 6,150,010) in view of Butterfield (US Patent 4,747,674).

9. Eissa discloses a fluorinated naphthalenophane and a vapor phase deposition of fluorinated polydimethylenenaphthalene. The film has a low dielectric constant and may be used in the production of integrated circuits. The film is deposited at a thickness of 0.25 microns (2500 angstroms) over dielectric 110 and silicon substrate 102. Dielectric 110 may be silicon oxide with metal lines 112-120 and metal filled vias 122-124 (col.4, 51-67). The sublimation of the dimer from the solid phase directly to the gas phase is performed in a low pressure vapor deposition polymerization chamber. Sublimation temperatures may be in the range of 100-125 °C. The cleaving or pyrolyzing temperatures are in the range of 450-550 °C (col.5-6, cl.3). Eissa does not disclose that the fluorinated naphthalenophane/ polydimethylenenaphthalene is an antireflective compound. Butterfield teaches that it is known that fluorinated polymeric materials have advantages when used as antireflective layers (col.4, 8-57). Therefore it would have been obvious to one of ordinary skill in the art that the fluorinated naphthalenophane/ polydimethylenenaphthalene precursor in the method of Eissa could be used as an antireflective compound because Butterfield teaches that fluorinated polymer materials are known to have advantages when used as antireflective layers.

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10. Claims 1, 3, 4, 7-12, 19, 21, 22, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nichols (US Patent 5,137,780) in view of NN73101442.

11. Nichols discloses a method for forming insulating coatings on a substrate.

Aromatic, substituted aromatic heterocyclic and acetylenic compounds are suitable as precursors for the glow discharge polymerized second layer. Olefins such as propylene, butane or hexane are used. Preferred precursors include benzene, toluene, xylene, pyridine, furan and indole. Particularly preferred compounds are di(p-xylylene) or di(chloro-p-xylylene) dimer of the type that is used in vapor deposition of parylene films (col.9, 60-68). The pyrolysis zone furnace was brought to 700 °C , while the sublimation zone furnace was increased to 110 °C. As the dimer vapor is passed through the pyrolysis zone it is cleaved into two molecules of the reactive intermediate mono(chloro-p-xylene). The film thickness of approximately 30 nm (300 angstroms) is deposited (col.14, 44-col.15, 24). Nicholas does not disclose that the parylene layer is an antireflective layer. NN73101442 teaches that an organic coating of parylene is a good candidate for an antireflective coating because it has an index of 1.7. Therefore it would have been obvious to one of ordinary skill in the art to use the parylene layer in the method of Nicholas as an antireflective layer because NN73101442 teaches that parylene has an index of 1.7, making it a good antireflective layer.

12. Claims 2, 13, 14, 20 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haaland, Eissa in view of Butterfield or Nicholas in view of NN73101441 as applied to claims 1 or 19 above, and further in view of Lee (US Patent 6,300,672).

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13. The references do not disclose forming a photoresist layer on the antireflection layer, and exposing, developing and etching the photoresist. Lee teaches that an antireflective coating, such as an organic polymeric ARC is usually provided on a wafer substrate in order to minimize the reflection of light back to the overlying photoresist layer for more uniform processing (col.1, 20-58). The photoresist layer is exposed, and developed and then used as mask to etch the organic ARC layer using conventional photolithographic techniques (col.7, 40-51). Therefore it would have obvious to one of ordinary skill in the art to form a photoresist layer over the antireflection layer in Haaland, Eissa in view of Butterfield or Nicholas in view of NN73101441 because Lee teaches that it is known in the art that an ARC layer will minimize the reflection of light back to the overlying photoresist layer for more uniform processing. It also would have been obvious to one of ordinary skill in the art to expose, develop and etch the photoresist in the Haaland, Eissa in view of Butterfield or Nicholas in view of NN73101441 because Lee teaches that these are conventional steps performed in a photolithographic process.

Conclusion


14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Linlui (US Patent 6,300,240) discloses a method for forming an organic antireflective layer. Subramanian (US Patent 6,309,955) discloses a CVD organic BARC. Sabnis (US 2001/0021481) is the Patent Application Publication for the present application.

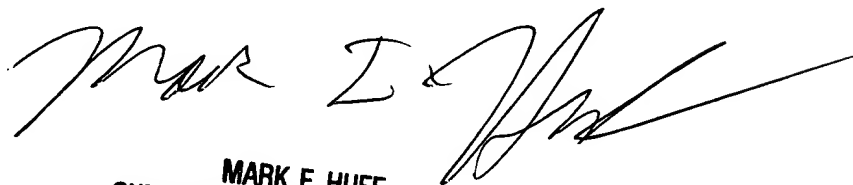
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15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicole M. Barreca whose telephone number is 703-308-7968. The examiner can normally be reached on Monday-Thursday (8:00 am-6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 703-308-2464. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

nmb 
November 1, 2002



MARK F. HUFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700